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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/828,635	04/05/2001	Kyusik Sin	RR-1681	5517

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EXAMINER

BERNATZ, KEVIN M

ART UNIT

PAPER NUMBER

1773

DATE MAILED: 05/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

A95

Office Action Summary	Application N .	Applicant(s)	
	09/828,635	SIN ET AL.	
	Examiner	Art Unit	
	Kevin M Bernatz	1773	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____. | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Applicants' request for reconsideration, filed on April 9, 2003, has been entered in the above-identified application.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 112

3. Claims 6, 7 and 17 – 20 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s); at the time the application was filed, had possession of the claimed invention. The above rejection is maintained for the reasons of record as set forth in Paragraph No. 5 of the Office Action mailed on December 26, 2002 (Paper No. 3).
4. Claims 17 – 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 17 – 20 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. The above

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rejection is maintained for the reasons of record as set forth in Paragraph No. 7 of the Office Action mailed on December 26, 2002 (Paper No. 3).

Claim Rejections - 35 USC § 103

5. Claims 1 – 5, 10 – 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasaki et al. ('125) in view of Hasegawa et al. ('338 B2) for the reasons of record as set forth in Paragraph No. 11 of the Office Action mailed on December 26, 2002 (Paper No. 3).
6. Claims 6, 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasaki et al. in view of Hasegawa et al. as applied above, and further in view of Ishikawa et al. ('734 B2) for the reasons of record as set forth in Paragraph No. 12 of the Office Action mailed on December 26, 2002 (Paper No. 3).
7. Claims 8 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasaki et al. in view of Hasegawa et al. as applied above, and further in view of Watanabe et al. ('338) for the reasons of record as set forth in Paragraph No. 13 of the Office Action mailed on December 26, 2002 (Paper No. 3).
8. Claims 1 – 4, 10 – 12, 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al. ('151) in view of Kurosawa et al. ('868) and Watanabe et

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al. ('338) for the reasons of record as set forth in Paragraph No. 14 of the Office Action mailed on December 26, 2002 (Paper No. 3).

9. Claims 5 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al. ('151) in view of Kurosawa et al. ('868) and Watanabe et al. ('338) as applied above, and further in view of Hasegawa et al. for the reasons of record as set forth in Paragraph No. 15 of the Office Action mailed on December 26, 2002 (Paper No. 3).

The Examiner notes that the original rejection had a typographical error referred to "claims 5 and 12", yet it is clear that claims 5 and 13 were intended since both claims 5 and 13 cover substantially identical subject matter (and claim 12 had already been rejected in Paragraph 14).

10. Claims 6, 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al. ('151) in view of Kurosawa et al. ('868) and Watanabe et al. ('338) as applied above, and further in view of Ishikawa et al. ('734) for the reasons of record as set forth in Paragraph No. 16 of the Office Action mailed on December 26, 2002 (Paper No. 3).

Response to Arguments

11. Examiner's Comments

Applicants comment that they do not understand the meaning of the phrase "open language" and, therefore, are unable to properly respond to the Examiner's

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interpretation of the claimed language as such. To clarify, the Examiner notes that the transitional phrase "comprising" is considered "open language" because it is open to other elements being present. Therefore, the Examiner was interpreting the transitional phrase "adjoining" as being open to other layers being located between the "adjoined" layers. However, based upon applicants' arguments and the attached Webster's dictionary definition of "adjoined", the Examiner has now interpreted "adjoined" as requiring that the layers be directly deposited on each other.

12. The objection to the abstract

The Examiner notes that applicants' are correct in that the Abstract is limited to 150 words or less. The limit of "15 lines" was a general rule of thumb given that an average line of text contains approximately 10 words. Since applicants' abstract contains only 139 words in 18 lines of text, the Examiner agrees that the as-filed abstract is acceptable for publication.

13. The rejection of claims 6, 7, 9, 17 - 20 under 35 U.S.C § 112 – 1st Paragraph

With regard to claim 9, the Examiner agrees that the disclosed structure is sufficiently enabled with regard to Figure 6. However, with regard to claims 6, 7 and 17 – 20, applicants recite Figure 3 as evidence supporting the claimed structure. The Examiner respectfully disagrees.

Based upon a detailed reading of applicants' disclosure, the Examiner deems that the confusion is based on the language "first", "second", "third" and "fourth"

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ferromagnetic layers. Applicants' specification specifically refers to the "first" and "second" ferromagnetic layers, as they apply to Figures 3 and 6, wherein in both cases, the "first" is the lowest ferromagnetic layer in the MR structure (*Paragraph 0022: "Atop pinning structure 102, first (pinned) ferromagnetic layer 104 ... and second (free) ferromagnetic layer 108 ..."; and Paragraphs 0029 – 0030: "A first soft or free ferromagnetic layer 206 is then formed ... followed by a second soft or pinned ferromagnetic layer 210"*). Since applicants' claims must be read in light of the specification, the language "first" and "second" ferromagnetic layer is directed to those layers explicitly labeled as such by applicants.

Therefore, with regard to claims 1 – 10 (which appear to relate to the embodiment in Figure 3), the "first" ferromagnetic (FM) layer is disclosed as layer 104, the "second" FM layer is disclosed as layer 108, and the "third" FM layer must be one of layers 111 or 112 (since the second non-FM layer – layer 110 - is disclosed to be located adjoining the 2nd and 3rd FM layers in claim 1). The added limitations in claim 6 requiring a fourth FM layer and a third non-FM layer, wherein the third non-FM adjoins said 3rd and 4th FM layers is not enabled, since there is no third non-FM layer in Figure 3 that adjoins both the third and fourth FM layers (i.e. if, as applicants' argue, layer 112 is the "fourth" FM layer, which layer is the third non-FM layer such that it adjoins both layer 112 and layer 111?). In view of Figure 6, it is possible applicants are intending to claim layer 203 as the "third" FM layer and layer 205 as the "fourth" FM layer, with the element 204 as the third "non-magnetic spacer" layer, but this also does not meet the claimed language since the second non-magnetic spacer layer must adjoin the "second"

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and “third” FM layers (elements 210 and 203 in Figure 6!). If applicants are attempting to claim the embodiment shown in Figure 6, the “third” FM layer in claim 6 should be replaced by the “first” FM layer to be consistent with applicants teachings of which layer is the “first” and “second” FM layers and the “first” FM layer in claim 7 should be replaced by the “third” FM layer.

With regard to claims 17 – 20, see the comments below with regard to the 35 U.S.C. 112 2nd Paragraph rejection currently of record.

14. The rejection of claims 2 and 17 - 20 under 35 U.S.C § 112 – 2nd Paragraph

Applicant(s) argue(s) that claim 2 appears to be in compliance with 35 U.S.C 112 2nd Paragraph. The Examiner agrees. The inclusion of claim 2 was a typographical error.

Regarding claims 17 – 20, applicants argue that since the meaning of the word “distal” is definite, claims 17 – 20 are definite. The examiner respectfully disagrees.

Claims 17 – 20 involve similar confusion in terms of the “first”, “second”, “third” and “fourth” FM layers as described above with respect to claims 6 and 7. Specifically, applicants’ claim a “first and second ferromagnetic layers that are disposed substantially in a plane”, yet as described above, the “first” and “second” ferromagnetic layers are explicitly disclosed in the specification to be elements 104 and 108 (in the embodiment represented by Figure 3) or elements 206 and 210 (in the embodiment represented by Figure 6). It is unclear how these layers are “disposed in a plane” and where the first, second and third portions of the “third” FM layer are located (since the third FM appears

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to be referring to elements 203 and 205 in Figure 6, or elements 111 and 112 in Figure 3). Again, the Examiner notes that the issue is that applicants are not using language similar to that utilized in the specification and that the claimed "third" FM may be referring to the free magnetic layer ("second" FM layer – element 108 – in Figure 3 and "first" FM layer – element 206 – in Figure 6). Also, it is unclear which layer is the "fourth" FM layer. Is it elements 202, as disclosed in Paragraph 0029 (last sentence), or is it one of elements 203 and 205, but if it's one of 203 and 205, then which is the non-FM electrically conductive layer (since element 204 is disclosed to be electrically insulating)? Finally, there is confusion where applicants call portions of a discontinuous "layer" (such as elements 203 and 205) as separate layers, yet elements 202 in Figure 6 are apparently recited as a single discontinuous layer. Applicants are suggested to review Paragraphs 0022, 0023, 0029 and 0030 and utilize language which better corresponds to the specification, since one of ordinary skill in the art must read the claims in light of the specification to fully comprehend the full scope covered by the claims. Specifically, if the claims recite a "first ferromagnetic layer" and the specification also recites a "first ferromagnetic layer", one of ordinary skill would look to the specification's disclosure related to the "first ferromagnetic layer" for such things as the desired thickness, alloy compositions, etc. If the claims are calling a layer different than what the specification calls it, one of ordinary skill in the art would not be able to understand the scope of the invention, nor how to produce the claimed invention.

**15. The rejection of claims 1 – 7, 9 – 14 and 16 under 35 U.S.C § 102() –
Ooshima et al.**

Applicant(s) argue(s) that Ooshima et al. does not disclose layers that are adjoined. Based upon applicants' arguments and Paragraph 11 above, the examiner agrees and this rejection has been withdrawn.

16. The rejection of claims 1 - 16 under 35 U.S.C § 103(a) – Iwasaki et al. in view of Hasegawa et al. (alone or in combination with additional references)

Applicant(s) argue(s) that Iwasaki et al. does not disclose a fixed portion of a second ferromagnetic layer. The examiner agrees. This limitation was addressed on page 9 of the Office Action mailed December 26, 2002 (Paper No. 3). Specifically, the Examiner deemed that such a limitation would necessarily result from the combined teachings of Iwasaki et al. in view of Hasegawa et al. since the claimed and prior art structures would be substantially identical.

Applicants further argue that the combination of Hasegawa et al. with Iwasaki et al. would destroy the Iwasaki et al. invention. The Examiner respectfully disagrees.

The Examiner notes that the “electrically conductive intermediate layer (12)” could be removed or not removed, as would be recognized by one of ordinary skill in the art. If the electrically conductive layer (12) was not removed, it would serve as a protection layer over the exposed track width portion of the free magnetic layer (11). This would result in one less etching step, thereby decreasing production cost and time. Alternatively, the conductive layer (12) could be deposited only on the edge portions,

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reducing the amount of electrically conductive material used, thereby decreasing cost.

Furthermore, Iwasaki et al. teach that the intermediate layer (12) primarily functions to provide antiferromagnetic coupling between the adjacent magnetic layers, which would still occur except only at the edge portions of the layers (*col. 17, lines 18 – 61*).

Hasegawa et al. teach that utilizing a structure providing biasing on each end of the free magnetic layer pins the magnetization at both ends of the free magnetic layer, reducing the occurrence of noise (*col. 9, line 56 bridging col. 10, line 10*). Therefore, the

Examiner deems that there is sufficient teaching in the prior art that such a combination would not destroy the disclosed Iwasaki et al. invention and applicants have presented no evidence that such a modification would destroy the claimed invention (attorney arguments are not considered evidence).

Conclusion

17. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M Bernatz whose telephone number is (703) 308-1737. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Thibodeau can be reached on (703) 308-2367. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0651.



KMB
May 22, 2003



Paul Thibodeau
Supervisory Patent Examiner
Technology Center 1700